INSTALLATION INSTRUCTIONS

WALL MOUNT ENERGY RECOVERY VENTILATOR WITH EXHAUST AND OUTDOOR AIR SHUT-OFF DAMPERS

Models:
WERVPA2  WERVPA3
WERVPC2  WERVPC3

For Use with Bard 1.5 – 3 Ton Wall Mount Air Conditioners and Heat Pumps
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WALL MOUNT ENERGY RECOVERY VENTILATOR MODEL NOMENCLATURE

W – Wall Mount
ERV – Energy Recovery Ventilator
P – Plug-In Vent Connection
A – Electrical
3 – Wall Mount – Cabinet Size
2 – W18 thru W24A* and H*
3 – W30 thru W36A* and H*
(* revision letter)

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage</th>
<th>Amps</th>
<th>Control Voltage</th>
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<tr>
<td>WERVPA2</td>
<td>230/208</td>
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<td>24V</td>
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<td>WERVPC3</td>
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</table>

The rotating energy wheels provide the heat transfer effectively during both summer and winter conditions. Provides required ventilation to meet the requirements of ASHRAE 62.1 standard.

NOTE: During operation below 5°F outdoor temperature, freezing of moisture in the heat transfer wheel can occur. Consult the factory if this possibility exists.

GENERAL DESCRIPTION

The Wall Mount Energy Recovery Ventilator was designed to provide energy efficient, cost effective ventilation to meet IAQ (Indoor Air Quality) requirements while still maintaining good indoor comfort and humidity control for a variety of applications such as schools, classrooms, lounges, conference rooms, beauty salons and others. It provides a constant supply of fresh air for control of airborne pollutants including CO₂, smoke, radon, formaldehyde, excess moisture, virus and bacteria.

The ventilator incorporates patented rotary heat exchanger technology to remove both heat and moisture.

It is designed as a single package which can be easily factory or field installed for new installations or retrofit to the new Bard W**A and W**H series wall-mounted units. The package consists of a unique rotary Energy Recovery Cassette that can be easily removed for cleaning or maintenance. The WERV*3 has two 13” diameter heat transfer wheels whereas the WERV*2 has one 13” diameter heat transfer wheel. The heat transfer wheels use a permanently bonded dry desiccant coating for total heat recovery.

Ventilation is accomplished with two blower/motor assemblies each consisting of a drive motor and dual blowers for maximum ventilation at low sound levels. The intake and exhaust blowers can be operated at the same speed (airflow rate) or different speeds to allow flexibility in maintaining desired building pressurization conditions. Factory shipped on medium intake and low exhaust. See Figure 6 on page 12 to change speeds.

GENERAL INFORMATION

The ventilator should only be installed by a trained heating and air conditioning technician. These instructions serve as a guide to the technician installing the ventilator package. They are not intended as a step-by-step procedure with which the mechanically inclined owner can install the package.

The ventilator housing is shipped in one carton which contains the following:
- Energy recovery ventilator
- Exhaust damper assembly
- Service door
- Rain hood and mist eliminator
- Installation instructions

UNPACKING

Upon receipt of the equipment, be sure to compare the model number found on the shipping label with the accessory identification information on the ordering and shipping document to verify that the correct accessory has been shipped.

Inspect the carton housing of each ventilator as it is received, and before signing the freight bill, verify that all items have been received and that there is no visible damage. Note any shortages or damage on all copies of the freight bill. The receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier’s agent. Concealed damage not discovered until after loading must be reported to the carrier within 15 days of its receipt.
### PERFORMANCE AND APPLICATION DATA – WERVP*2

#### Summer Cooling Performance (Indoor Design Conditions 75°F/62°WB)

<table>
<thead>
<tr>
<th>Ambient OD</th>
<th>DB/ WB</th>
<th>F</th>
<th>VLT</th>
<th>VLS</th>
<th>VLL</th>
<th>HRT</th>
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**NOTE:** All performance data is based on the same speed.

### Winter Heating Performance (Indoor Design Conditions 70°F DB)

<table>
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<th>VLT</th>
<th>VLS</th>
<th>VLL</th>
<th>HRT</th>
<th>HRS</th>
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**LEGEND:**
- VLT = Ventilation Load – Total
- VLS = Ventilation Load – Sensible
- VLL = Ventilation Load – Latent
- HRT = Heat Recovery – Total
- HRS = Heat Recovery – Sensible
- HRL = Heat Recovery – Latent
- WVL = Winter Ventilation Load
- WHR = Winter Heat Recovery

**NOTE:** All performance data is based on operating intake and exhaust blower on the same speed.
### PERFORMANCE AND APPLICATION DATA – WERVP*3

#### Summer Cooling Performance
(Indoor Design Conditions 75°DB/62°WB)

<table>
<thead>
<tr>
<th>Ambient OD</th>
<th>DB/°F</th>
<th>VLT</th>
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### Winter Heating Performance
(Indoor Design Conditions 70°F DB)

<table>
<thead>
<tr>
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<th>400 CFM 75% Eff.</th>
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<th>250 CFM 77% Eff.</th>
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<td>WHR</td>
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**Legend:**
- VLT = Ventilation Load – Total
- VLS = Ventilation Load – Sensible
- VLL = Ventilation Load – Latent
- HRT = Heat Recovery – Total
- HRS = Heat Recovery – Sensible
- HRL = Heat Recovery – Latent
- WVL = Winter Ventilation Load
- WHR = Winter Heat Recovery

**Note:** All performance data is based on operating intake and exhaust blower on the same speed.
**BASIC FIELD INSTALLATION**

1. Unpack the ventilator assembly which includes the integral ventilator with attached electrical harness and miscellaneous hardware.

   **WARNING**

   Open and lock unit disconnect switch before installing this accessory to prevent injury or death due to electrical shock or contact with moving parts. Turn thermostat to OFF.

2. Disconnect unit power.

3. Remove the existing exterior blower access, filter access and vent option panels on the wall mount unit (see Figure 1). Save the blower access and filter access panels and discard the vent option panel.

   **CAUTION**

   Be sure the correct model and voltage energy recovery ventilator is used with the correct air conditioner or heat pump to ensure correct voltage compatibility.

<table>
<thead>
<tr>
<th>Model</th>
<th>For Use with the Following Units</th>
<th>Electrical</th>
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<tbody>
<tr>
<td>WervPC2</td>
<td>W24A*-C</td>
<td>W24H*-C</td>
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<td>WervPC3</td>
<td>W30A*-C, W36A*-C</td>
<td>W30H*-C, W36H*-C</td>
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</tbody>
</table>

**FIGURE 1**

Remove Access Panels
4. Remove and save existing unit return air filter. Remove left side filter support bracket by unscrewing two (2) screws from left side of unit. Remove and save top four (4) screws from front grille (see Figure 2).

5. Remove and discard exhaust cover plate (see Figure 2).

6. Install exhaust damper assembly into opening where exhaust cover plate was removed using two screws on the front edge (see Figure 2).
7. Insert ventilator into the unit to the far left side, making sure to clear the right filter bracket. Once the ventilator is fully inserted, slide the ventilator to the right until it is tight against the back of the control panel (see Figure 3).

**IMPORTANT NOTE:** Position front lip of ventilator over front grille and on top of condenser partition (see Figure 3 inset). This is important to insure proper drainage of any water entering damper assembly.

8. Remove outer and inner control panel covers.

9. Remove female plug of high voltage wiring harness (3-pin plug) from the heat recovery assembly and snap into unit control panel (from inside control panel) in the hole provided. Wire to top of compressor contactor per wiring diagram (see Figure 4). Connect high voltage plugs back together (see Figure 3).
10. Plug low voltage plug (12-pin plug) from the heat recovery unit into the front side of the control panel (see Figures 3 and 4).

**NOTE:** These 24 volt control wires control the starting and stopping of the energy recovery ventilator and can be independently controlled by an energy management control or timer. See section on Control Wiring on page 11.

11. Replace inner and outer control panel covers.

12. Ventilator checkout
   A. Resupply power to unit.
   B. Energize the “A” occupancy 24 volt signal on the low voltage terminal strip (jumper “R” to “A”).

**FIGURE 4**
Install Low and High Voltage Plugs and Wiring
C. Ventilator heat transfer wheels should rotate slowly (49 RPM). Intake and exhaust blowers should run and indoor comfort blower should run.

D. De-energize the “A” terminal. The energy recovery wheels, fresh air, exhaust air and indoor comfort blowers should stop.

E. This completes ventilator checkout.

13. Re-install the blower access and filter access panels at top of unit and secure with sheet metal screws.

14. Replace the vent option access panel with the new panel provided. Attach air intake hood with screws provided (see Figure 5). Be sure to insert the top flange of the air intake hood into and through the slot of the service door and between the door and insulation to prevent bowing of the door.

15. Apply Certification label, included with installation instructions, next to unit serial plate.

16. Ventilator is now ready for operation.

**FIGURE 5**

**Install Fresh Air Intake Hood Assembly**

![Diagram of Fresh Air Intake Hood Assembly](image-url)
CONTROL WIRING

The WERVP comes from the factory with the low voltage control wires connected to the wall mount low voltage terminal strip. Care must be taken when deciding how to control the operation of the ventilator. When designing the control circuit for the ventilator, the following requirements must be met.

Control Requirements

1. Indoor blower motor will automatically run whenever the WERVP is run.

2. Select the correct motor speed tap in the WERVP. Using Table 2, determine the motor speed needed to get the desired amount of ventilation air needed. For instance, do not use the high speed tap on a WERVP*3 if only 250 CFM of ventilation air is needed. Use the low speed tap instead (see VENTILATION AIRFLOW for information on moving the speed taps). Using the high speed tap would serve no useful purpose and significantly affect the overall efficiency of the air conditioning system. System operating cost would also increase.

3. Run the WERVP only during periods when the conditioned space is occupied. Running the WERVP during unoccupied periods wastes energy, decreases the expected life of the WERVP and can result in a large moisture buildup in the structure. The WERVP removes 60-70% of the moisture in the incoming air, not 100% of it. Running the WERVP when the structure is unoccupied allows moisture to build up in the structure because there is little or no cooling load. Thus, the air conditioner is not running enough to remove the excess moisture being brought in. Use a control system that in some way can control the system based on occupancy.

<table>
<thead>
<tr>
<th>Model</th>
<th>High Speed (Black)</th>
<th>Medium Speed (Blue)</th>
<th>Low Speed (Red)</th>
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Recommended Control Sequences

Several possible control scenarios are listed below:

1. Use a programmable electronic thermostat with auxiliary terminal to control the WERVP based on daily programmed occupancy periods. Bard markets and recommends Bard Part No. 8403-060 programmable electronic thermostat for air conditioner and heat pump applications.

2. Use a motion sensor in conjunction with a mechanical thermostat to determine occupancy in the structure. Bard recommends Bard Model CS9B*-**** CompleteStat for this application.

3. Use a CO₂ control with dry contacts to energize the WERVP when CO₂ levels rise above desired settings.

4. Use a DDC control system to control the WERVP based on a room occupancy schedule to control the WERVP.

5. Tie the operation of the WERVP into the light switch. The lights in a room are usually on only when occupied.

6. Use a manual timer that the occupants turn to energize the WERVP for a specific number of hours.

7. Use a programmable mechanical timer to energize the WERVP and indoor blower during occupied periods of the day.

VENTILATION AIRFLOW

The WERVPA* and WERVPC* are equipped with a 3-speed motor to provide the capability of adjusting the ventilation rates to the requirements of the specific application by changing motor speeds (see Table 2).

WARNING

Open disconnect to shut all power OFF before changing motor speeds. Failure to do so could result in injury or death due to electrical shock.

The units are set from the factory with the exhaust blower on the low speed and the intake blower on medium speed. Moving the speed taps located in the control panel can change the blower speed of the intake and exhaust (see Figure 6 on page 12).
FIGURE 6
Speed Tap Label

TO ADJUST INTAKE AND
EXHAUST BLOWER SPEEDS
1. DISCONNECT POWER TO UNIT
2. REMOVE ERV CONTROL PANEL COVER
3. MOVE BLACK INSULATOR TO DESIRED
   SPEED ON TERMINAL CONNECTOR
ENERGY RECOVERY VENTILATOR MAINTENANCE

General Information

The ability to clean exposed surfaces within air moving systems is an important design consideration for the maintenance of system performance and air quality. The need for periodic cleaning will be a function of operating schedule, climate and contaminants in the indoor air being exhausted and in the outdoor air being supplied to the building. All components exposed to the airstream, including energy recovery wheels, may require cleaning in most applications.

Rotary counterflow heat exchanges (heat wheels) with laminar airflow are “self-cleaning” with respect to dry particles. Smaller particles pass through; larger particles land on the surface and are blown clear as the flow direction is reversed. For this reason, the primary need for cleaning is to remove films of oil-based aerosols that have condensed on energy transfer surfaces. Buildup of material over time may eventually reduce airflow. Most importantly, in the case of desiccant-coated (enthalpy) wheels, such films can close off micron-sized pores at the surface of the desiccant material, reducing the efficiency with which the desiccant can absorb and desorb moisture.

Frequency

In a reasonably clean indoor environment such as a school, office building or home, experience shows that reductions of airflow or loss of sensible (temperature) effectiveness may not occur for 10 or more years. However, experience also shows that measurable changes in latent energy (water vapor) transfer can occur in shorter periods of time in commercial, institutional and residential applications experiencing moderate occupant smoking or with cooking facilities. In applications experiencing unusually high levels of occupant smoking, such as smoking lounges, nightclubs, bars and restaurants, washing of energy transfer surfaces, as frequently as every 6 months, may be necessary to maintain latent transfer efficiency. Similar washing cycles may also be appropriate for industrial applications involving the ventilation of high levels of smoke or oil-based aerosols such as those found in welding or machining operations, for example. In these applications, latent efficiency losses of as much as 40% or more may develop over a period of 1 to 3 years.

Cleanability and Performance

In order to maintain energy recovery ventilation systems, energy transfer surfaces must be accessible for washing to remove oils, grease, tars and dirt that can impede performance or generate odors. Washing of the desiccant surfaces is required to remove contaminate buildups that can reduce adsorption of water molecules. The continued ability of an enthalpy wheel to transfer latent energy depends upon the permanence of the bond between the desiccant and the energy transfer surfaces.

Bard wheels feature silica gel desiccant permanently bonded to the heat exchange surface without adhesives; the desiccant will not be lost in the washing process. Proper cleaning of the Bard energy recovery wheel will restore latent effectiveness to near original performance.

Maintenance Procedures

NOTE: Local conditions can vary and affect the required time between routine maintenance procedures; therefore, all sites (or specific units at a site) may not have the same schedule to maintain acceptable performance. The following timetables are recommended and can be altered based on local experience.

Quarterly Maintenance

1. Inspect mist eliminator/prefilter and clean if necessary. This filter is located in the fresh air intake hood on the front of the unit. This is an aluminum mesh filter and can be cleaned with water and any detergent not harmful to aluminum.

2. Inspect wall mount unit filter and clean or replace as necessary. This filter is located either in the unit, in a return air filter grille assembly or both. If in the unit it can be accessed by removing the lower service door on the front of the unit. If in a return air filter grille, by hinging the grille open to gain access.

3. Inspect energy recovery ventilator for proper wheel rotation and dirt buildup. This can be done in conjunction with Item 2 above. Energize the energy recovery ventilator after inspecting the filter and observe for proper rotation and/or dirt buildup.

4. Recommended energy recovery wheel cleaning procedures follow: Disconnect all power to unit. Remove the lower service door of the wall mount unit to gain access to the energy recovery ventilator.

5. Remove the front access panel on the ventilator. Unplug amp connectors to cassette motors. Slide energy recovery cassette out of ventilator.

6. Use a shop vacuum with brush attachment to clean both sides of the energy recovery wheels.

7. Reverse shop vacuum to use as a blower and blow out any residual dry debris from the wheel.

NOTE: Discoloration and staining of the wheel does not affect its performance. Only excessive buildup of foreign material needs to be removed.
8. If any belt chirping or squealing noise is present, apply a small amount of LPS-1 or equivalent dry film lubricant to the belt.

**Annual Maintenance**

1. Inspect and conduct the same procedures as outlined under *Quarterly Maintenance*.

2. To maintain peak latent (moisture) removal capacity, it is recommended that the energy recovery wheels be sprayed with a diluted nonacid-based evaporator coil cleaner or alkaline detergent solution such as 409.

**NOTE:** Do not use acid-based cleaners, aromatic solvents, temperatures in excess of 170°F or steam. Damage to the wheel may result.

*Do not disassemble and immerse the entire heat wheel in a soaking solution, as bearing and other damage may result.*

3. Rinse wheel thoroughly after application of the cleaning solution and allow to drain before reinstalling.

4. No re-lubrication is required to heat wheel bearings of the drive motor, or to the intake and exhaust blower motors.

5. If any belt chirping or squealing noise is present, apply a small amount of LPS-1 or equivalent dry film lubricant to the belt.

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3. **Figure 8**

Belt Replacement Instructions

(Two Wheel Cassette Only)

![Belt Replacement Instructions Diagram](image-url)
FIGURE 9
Hub Assembly with Ball Bearings

- Screw #6 x 32 x 3/4
- Dust Cover
- Screw #10 x 32
- Washer
- Nut #10 x 24
- Spacers
- Hub Plate
- Bearing
- Hub Plate with Bolts
- Heat Exchanger Wheel
- Shaft (Oil with 20 Wt.
  Non Detergent Oil)
- Lock Washer
- Nut 1/4 x 20

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